in his concluding remarks as to whether "there is a causal connection between solar activity (as indicated by outbursts on the sun) and magnetic disturbances, auroras, cyclones, and rainfall," remarks that with regard to the two former there can hardly be any doubt, but with regard to the two latter he is of opinion that a very close connection does exist, there being a considerable preponderance of evidence in its favour.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—*Annual Abstract of Accounts.*—The abstract of accounts of the University for the year ending December 31, 1891, has just been published. It exhibits both the accounts of the Curators of the Chest and the financial position of the University institutions. The receipts show an income of £66,986 12*s.* 9*d.*, against £65,175 17*s.* 2*d.* last year. The principal sources of internal income include estates £9978 12*s.* 8*d.*, the University Press £5000, University dues £11,153 5*s.*, examination fees £5659 1*s.*, degree fees £9600. The Proctorial fines amount to only £313, nearly £100 less than last year. In connection with the present agitation against Proctorial jurisdiction this item is interesting. The total payments amounted to £64,557 6*s.* 3*d.* There was transferred to capital account £2225 16*s.* 4*d.*, and a balance carried forward of £203 10*s.* 2*d.* In this item of expenditure, we find institutions and public buildings cost £19,085, the largest item under this head being the Bodleian Library £7772 4*s.* 4*d.*, while the Taylor Institution absorbed £2245. The expenses in connection with lectures in large towns amounted to £729 11*s.* 8*d.*, and the interest and sinking fund on loans for University purposes came to £6157 8*s.* 4*d.*

The loans account shows that the amounts remaining to be paid are £36,000 at 4 per cent. on the £60,000 New Schools Loan, and £7666 13*s.* 4*d.* at 2¾ per cent. on the £10,000 Physiological Laboratory Loan.

The University and the County Councils.—The report on the peripatetic teaching in scientific and technical subjects carried on in various country districts under the supervision of the Oxford Delegates for University Extension, acting in concert with the Technical Instruction Committees of County Councils during last winter, has just been published. The report states that the Oxford Delegates for University Extension were requested by the representatives of eight County Councils in England to provide for the delivery of 227 courses, embracing 2271 lectures, on chemistry, agriculture, geology, botany, veterinary science, physiology, and hygiene. These courses have been regularly attended by more than 10,000 persons in all grades of society.

The relations between the University Extension Committees of the different Universities and the County Councils, in reference to the matter of technical instruction, has now become so important, that a Conference was summoned last week, under the presidency of the Provost of Queen's College, to consider this connection, and to profit by the experience already gained, an experience, which in some cases extends over two years. It was felt that there are certain mistakes, inevitable in the commencement of any large scheme, which might be advantageously removed, so as to promote greater harmony, and possibly more economy in the fuller development of the scheme. Many organizing secretaries and others interested in the scheme attended the Conference, which extended over two days.

Two principal subjects were under discussion, first, the provision of summer courses of instruction in Oxford, Cambridge, and other University towns for teachers in elementary schools; secondly, the methods of organization of peripatetic teaching in regard to hours of lectures, classes, cost, and local management. In connection with the first point, it was announced that Oxford, Cambridge, and the Yorkshire College, Leeds, would be prepared to offer accommodation to students this summer; the Victoria University has, however, made no such provision. The method of procuring instruction in practical agriculture and experimental farming occupied much of the attention of the meeting, and much stress was laid upon the importance of securing the co-operation of farmers to look after the experimental stations.

On the matter of peripatetic teaching, it was felt by some that no very great assistance could be expected from the elementary teacher, and that reliance must be placed upon the teacher supplied by the Universities, in some cases advantageously supplemented by the teachers in secondary schools.

Not the least important feature in the Conference was the anxiety displayed by all present to urge on to the utmost of their power the great work of the dissemination of technical and scientific instruction, influenced solely by disinterested motives for the public service.

CAMBRIDGE.—Prof. Bonney, F.R.S., Fellow of St. John's College, will this year deliver the Rede Lecture in the Senate House, on Wednesday, June 15, at noon. The subject is "The Microscope's Contributions to the Earth's Physical History.'

The Adams Memorial Committee have issued a circular inviting contributions towards the erection of a monument to the late Prof. J. C. Adams in Westminster Abbey. These may be paid to one of the treasurers (Dr. Searle, Master of Pembroke, and Prof. Liveing), or to one of the secretaries (Dr. Porter, Master of Peterhouse, Dr. Donald MacAlister, St. John's, and Dr. Glaisher, Trinity), or to the account of the Adams Memorial Fund at Messrs. Mortlock's Bank, Cambridge. We do not doubt that the invitation will meet with a generous response from the admirers of the great astronomer.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 28.—"On a Decisive Test-case disproving the Maxwell-Boltzmann Doctrine regarding Distribution of Kinetic Energy." By Lord Kelvin, Pres. R.S.

The doctrine referred to is that stated by Maxwell in his paper "On the Average Distribution of Energy in a System of Material Points" (Camb. Phil. Soc. Trans., May 6, 1878, republished in vol. ii. of Maxwell's "Scientific Papers") in the following words:—

"In the ultimate state of the system, the average kinetic energy of two given portions of the system must be in the ratio of the number of degrees of freedom of those portions."

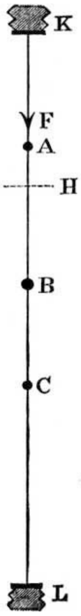
Let the system consist of three bodies, A, B, C, all movable only in one straight line, KHL:

B being a simple vibrator controlled by a spring so stiff that when, at any time, it has very nearly the whole energy of the system, its extreme excursions on each side of its position of equilibrium are small:

C and A, equal masses:

C, unacted on by force except when it strikes L, a fixed barrier, and when it strikes or is struck by B:

A, unacted on by force except when it strikes or is struck by B, and when it is at less than a certain distance, HK, from a fixed repellent barrier, K, repelling with a force, F varying, according to any law, or constant, when A is between K and H, but becoming infinitely great when (if at any time) A reaches K, and goes infinitesimally beyond it.



Suppose now A, B, C to be all moving to and fro. The collisions between B and the equal bodies A and C on its two sides must equalize, and keep equal, the average kinetic energy of A, immediately before and after these collisions, to the average kinetic energy of C. Hence, when the times of A being in the space between H and K are included in the average, the average of the *sum of the potential and kinetic energies of* A is equal to the average kinetic energy of C. But the potential energy of A at every point in the space HK is positive, because, according to our supposition, the velocity of A is diminished during every time of its motion from H towards K, and increased to the same value again during motion from K to H. Hence, the average kinetic energy of A is less than the average kinetic energy of C!

This is a test-case of a perfectly representative kind for the theory of temperature, and it effectually disposes of the assumption that the temperature of a solid or liquid is equal to its average kinetic energy per atom, which Maxwell pointed out as a consequence of the supposed theorem, and which, believed to be thus established, has been largely taught, and fallaciously used, as a fundamental proposition in thermodynamics.

It is, in truth, only for an approximately "perfect" gas—that is to say, an assemblage of molecules in which each molecule moves for comparatively long times in lines very approximately straight, and experiences changes of velocity and direction in comparatively short times of collision—and it is only for the kinetic energy of the translatory motions of the molecules of the "perfect gas," that the temperature is equal to the average kinetic energy per molecule, as first assumed by Waterston, and afterwards by Joule, and first proved by Maxwell.

"Researches on Turacin, an Animal Pigment containing Copper; Part II." By A. H. Church, M.A., F.R.S., Professor of Chemistry in the Royal Academy of Arts, London.

This paper is in continuation of one read before the Society in May 1869 (Phil. Trans., vol. clix. pp. 627-36). It contains an account of observations made by other investigators on turacin and on the occurrence of copper in animals; a table of the geographical distribution of the Touracos, and a list of the twenty-five known species; a chart of turacin spectra (for which the author is indebted to the kindness of Dr. MacMunn); and a further examination of the chemical characters and the composition of turacin. The more important positions established by the present inquiry are these:—

1. The constant occurrence in eighteen out of the twenty-five known species of *Musophagidæ*, of a definite organic pigment containing, as an essential constituent, about 7 per cent. of copper.

2. The "turacin-bearers" comprise all the known species of the three genera, *Turacus*, *Gallirex*, and *Musophaga*; while from all the species of the three remaining genera of the family *Musophagidæ*—namely, *Corythæola*, *Schizorhis*, and *Gymnoschizorhis*—turacin is absent. Furthermore, the zoological arrangement of the genera constituting this family is in accord with that founded on the presence of turacin.

3. The spectrum of turacin in alkaline solution shows, besides the two dark absorption bands previously figured, a faint broad band on either side of line F, and extending from λ 496 to λ 475.

4. The spectrum of *isolated* turacin in ammoniacal solution shows, besides the three bands already named, a narrow fourth band, lying on the less-refrangible side of line D, and extending from λ 605 to λ 589. It probably arises from the presence of traces of the green alteration-product of turacin formed during the preparation of that pigment in the isolated condition; an alteration-product which is likely to prove identical with Krukenberg's turacoverdin.

5. Turacin in ammoniacal solution remains unchanged after the lapse of twenty-three years.

6. Turacin in the dry state, when suddenly and strongly heated, yields a volatile copper-containing red derivative, which, though undissolved by weak ammonia-water, is not only soluble in, but may be crystallized from, ether.

7. Turacin in the dry state, when heated in a tube surrounded by the vapour of boiling mercury, becomes black, gives off no visible vapour, is rendered insoluble in alkaline liquids, and is so profoundly changed that it evolves no visible vapour when afterwards strongly heated.

8. The accurate analysis of turacin offers great difficulty. The percentage composition, as deduced from those determinations which seem most trustworthy, is—

Carbon	53·69
Hydrogen	4·60
Copper	7·01
Nitrogen	6·96
Oxygen	27·74

These numbers correspond closely with those demanded by the empirical formula $C_{82}H_{81}Cu_2N_9O_{32}$, although the author lays no stress upon this expression.

9. Turacin presents some analogies with hæmatin, and yields, by solution in oil of vitriol, a coloured derivative, turacoporphyrin. The spectra of this derivative, both in acid and alkaline solution, present striking resemblances to those of hæmatoporphyrin, the corresponding derivative of hæmatin. But copper is present in the derivative of turacin, while iron is absent from its supposed analogue, the derivative of hæmatin.

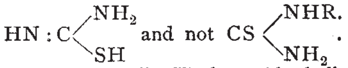
Chemical Society, April 7.—Dr. W. H. Perkin, F.R.S., Vice-President, in the chair.—The following papers were read:—The separation of arsenic, antimony, and tin, by J. Clark. The mixed sulphides of arsenic, antimony, and tin obtained in the ordinary course of quantitative analysis are dissolved in a strong solution of ferric chloride in hydrochloric acid, and the arsenic distilled off and weighed as trisulphide. The residual liquor contains the antimony as trichloride, and the tin as stannic chloride, together with ferrous and ferric chlorides. Without removing the iron salts, the antimony is precipitated with hydrogen sulphide in a tepid solution containing from one-quarter to one-third of its volume of hydrochloric acid and a considerable quantity of oxalic acid. The precipitate, which is free from tin, is washed first with water, then with alcohol, and finally with carbon disulphide, and weighed as Sb_2S_3 after being dried at 130°. When the antimony precipitate is large, it must, after drying, be digested in carbon disulphide to extract the whole of the sulphur. To obviate this, the author reduces the excess of ferric chloride with thin sheet-iron, as soon as the yellow colour has disappeared the undissolved iron is removed, and the antimony which has come down is redissolved by cautiously adding ferric chloride till the solution is distinctly yellow, showing that all the tin is in the stannic state; a warm solution of oxalic acid containing about one-third of its volume of hydrochloric acid is then added, and the precipitated antimony trisulphide washed and weighed as above. After removal of the antimony, the hydrogen sulphide is expelled by boiling, the oxalic acid decomposed with potassium permanganate, the tin precipitated in a hot solution with hydrogen sulphide, and allowed to stand till cold. The stannic sulphide thus obtained is filtered, washed, ignited, and weighed as SnO_2.—Platinous chloride and its use as a source of chlorine, by W. A. Shenstone and C. R. Beck. The authors have examined chlorine prepared from six specimens of platinous chloride of independent origin, and have found oxygen and hydrogen chloride to be present in them all. From these results they conclude that platinous chloride made by any of the processes hitherto recommended, including that lately suggested by L. Pigeon, contains a very perceptible quantity of some basic compound, which gives off water, together with the gases previously mentioned. It was also noticed that after mercury has been exposed to the action of chlorine, in the presence of a trace of water, it becomes capable of absorbing hydrogen chloride; it is not yet certain whether this action depends on the presence of oxygen or not.—Note on the adhesion of mercury to glass in the presence of halogens, by W. A. Shenstone. The author finds that carefully purified chlorine, bromine, and iodine affect mercury like ozone, causing it to adhere to glass in a remarkably perfect manner.—The decomposition of mannitol and dextrose by the *Bacillus ethaceticus*, by P. F. Frankland and J. S. Lumsden. The authors find that the products of fermentation of both mannitol and dextrose by *B. ethaceticus* consist of ethyl alcohol, acetic acid, carbon dioxide, hydrogen, and traces of succinic acid. A considerable quantity of formic acid is also formed when the fermentation proceeds in a closed space, whilst, in fermentations conducted in flasks merely plugged with cotton wool, formic acid, except in traces, is an exceptional product. This phenomenon has previously been found to occur with fermentations by means of *B. ethacetosuccinicus*. Formic acid is doubtless a primary product of the fermentation, but tends to break down into carbon dioxide and hydrogen. In the closed space, however, equilibrium is soon established between the formic acid and its decomposition products, and part of the formic acid is subsequently found in the solution. This view is supported by the fact that carbon dioxide and hydrogen are found in almost equal volumes. The proportions in which the several products are obtained from mannitol are approximately represented by the equation—

$$3C_6H_{14}O_6 + H_2O = C_2H_4O_2 + 5C_2H_6O + 5CH_2O_2 + CO_2.$$

In the case of dextrose the products occur in the proportions: $2{\cdot}5C_2H_6O : 1{\cdot}5C_2H_4O_2 : 3CH_2O_2 : CO_2$. There is a close qualitative and quantitative resemblance between fermentations by *B. ethaceticus* and those occurring by means of the *Pneumococcus* (Friedländer), which renders it probable that this ethacetic decomposition is a very general and typical form of fermentative change.—The preparation of glycollic acid, by H. G. Colman. Glycollic acid may be readily prepared by boiling concentrated potassium chloracetate solution for 24-30 hours. The liquid is then distilled under reduced pressure, and the residue mixed with acetone. On evaporation of the filtered solution, glycollic acid crystallizes out in colourless crystals, containing only about 0·5 per cent. of ash. This acid would seem to be dimorphous. Glycollic anilide may be prepared by heating glycollic acid for some time to 240°, and boiling the product with aniline.—Researches on silicon compounds and their derivatives; Part vi. The action of silicon tetrachloride on substituted phenylamines, by J. E. Reynolds. Diphenylamine combines with silicon tetrachloride to form an unstable addition compound, which is decomposed below the boiling-point of benzene. Ethylaniline is easily acted on by the tetrachloride, ethylaniline hydrochloride separates, and a compound having the composition Si(PhNEt)$_4$ is formed. Diethylaniline is but feebly acted on by silicon tetrachloride; the compound PhNEt$_2$HCl is formed, and probably a substance of the composition Si(C$_6$H$_4$NEt$_2$)$_4$.—Chemistry of the compounds of thiourea and thiocarbimides with aldehyde-ammonia, by A. E. Dixon. The alkyl and allied thiocarbimides react with aldehyde-ammonia, in accordance with the following equation—

$$R.NCS + 2R'CH(OH)NH_2 = CSN_3H_2R(CHR')_2 + 2H_2O.$$

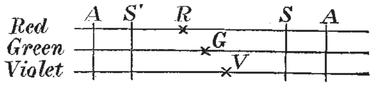
It was suggested that some connection might exist between the class of substances so formed and the compounds obtained by the action of thiourea on the aldehyde-ammonias. From the great similarity in behaviour of the compounds derived from the two sources, the author infers that they are members of the same class. Though thiourea and aldehyde-ammonia readily interact, it was found impossible, under any conditions, to cause substituted thioureas to act on aldehyde-ammonia. The author considers that this fact indicates that the monosubstituted thioureas are of the form



$$HN:C\begin{matrix}\diagup NH_2\\ \diagdown SH\end{matrix} \text{ and not } CS\begin{matrix}\diagup NHR.\\ \diagdown NH_2\end{matrix}.$$

—The atomic weight of boron, by J. L. Hoskyns-Abrahall. The deceased author determined the atomic weight of boron by estimating the amount of silver necessary to precipitate the bromine from a known weight of boron bromide. The mean atomic weight obtained is 10·816 ± 0·0055. Silver is taken as 107·923, and bromine as 79·951.

Physical Society, April 8.—Dr. J. H. Gladstone, F.R.S., Past President, in the chair.—Mr. Walter Baily read a paper on the construction of a colour map. By the term "colour map," the author meant a diagram, each point of which defines by its position some particular colour. Captain Abney had shown that all colours, except the purples, could be formed by adding white light to some spectrum colour, whilst all except the greens could be made to produce white by the addition of some spectrum colour. There were, therefore, two ways in which colours, other than greens and purples, could be indicated. In one of these, the ordinate of a point might represent the spectrum colour by its wave-length, and the abscissa, measured to the right of a vertical spectrum line, the amount of white light to be added to the spectrum colour to produce the colour represented by the point. In the other, the abscissa of a point situated on the left of the spectrum line represents the quantity of white light produced by the addition of the spectrum colour to the colour indicated by the point. Regarding the spectrum colours as formed by mixing three primary colours (red, green, and violet) in varying proportions, three curves were drawn to the left of the spectrum line whose abscissæ represented respectively the proportions of the three primary colours present in the corresponding spectrum colour. Horizontal distances from any point to these curves show the proportions in which the primary colours are to be mixed produce to the particular colour defined by that point. For points between the curves, the horizontal distances are not measured all in one direction, and therefore indicate abnormal or imaginary colours. The principle of the map was further illustrated by a sort of colour staff, consisting of three horizontal lines representing the three primary colour sensations (see figure) of such luminosities that equal lengths of the three lines indicate white light. If points, R, G, V, be taken in these lines, then a cross line A will cut off lengths A R, A G, A V, whose mixture will produce a certain colour. If now A be moved parallel to itself towards the right, the colour will change by the addition of white light; moving A to the left means a subtraction of white light. When R, G, and V are properly chosen, a certain position, S, of the cross line, corresponds to a spectrum colour. The whole of the series of colours which can be obtained by adding white light to that spectrum colour can then be represented by sliding A towards the right. Positions S' and A' give colours complementary to S and A. The distinguishing features of such a series of colours are the differences R − G and G − V, and the author calls the ratio $\frac{R-G}{G-V}$ the "colour index." Passing up the spectrum from red to violet, the index, which is first large and positive, diminishes and becomes negative between yellow and blue; it then passes through infinity, and becomes positive and decreases to zero. The subject of determining the indexes of colours resulting from the mixture in various proportions of two other colours whose indexes were known, was considered, and diagrams showing the various curves, exhibited. Experimental methods of determining the proportions of the primary colour sensations constituting the spectrum tints were described. A visitor inquired how the author's system provided for the class of colours outside the red and violet. He also desired a definition of "white light." He himself had never been able to produce pure white by mixture of colours, for a reddish violet generally resulted. On the other hand, he found it possible to match any other colour by mixture. Prof. Carey Foster thought Helmholtz was the first to propound the law which the author had attributed to Captain Abney. He wished to know how the amounts of colour sensation were supposed to be measured. White light he considered ought to be defined as light in which a normal eye, not fatigued, could perceive no preponderance of any colour. Mr. Blakesley said that if white light was a mixture, and only two unknowns were necessary, then any colour could be produced by the mixture of two other colours. Dr. Sumpner pointed out that white light was by no means a constant colour, but depended greatly on the source. He thought the author's map of a more absolute nature than that proposed by Maxwell. Dr. Hoffert inquired whether the intensities of each spectrum colour had been considered equal or otherwise taken into account, and also whether the results arrived at would be true for intensities other than those chosen. Mr. Baily, in reply, said Captain Abney had found the light from the crater in the positive carbon of an electric arc to be the most constant white, and in his method of experimenting errors due to variations of the source cancelled. The quantity of any spectrum colour was defined by the breadth of the band used, the breadth being small and measured on the scale of wave-lengths.—A paper on a mnemonic table for changing from electro-static to practical and C.G.S. electro-magnetic units was read by Mr. W. Gleed. In the table, which is given below, the abbreviations *Stat* and *Mag* are used to denote the electro-static and electro-magnetic units respectively, and v stands for 3×10^{10} :—



	Units of				
	Capacity.	Resistance.	Potential.	Current.	Quantity.
Powers of 10 for practical and magnetic units	9	9	8	1	1
Small unit	Stat	Mag	Mag	Stat	Stat
Practical unit	Farad	Ohm	Volt	Ampere	Coulomb
Large unit	Mag	Stat	Stat	Mag	Mag
Factor for Stat and Mag	v^2	v^2	v	v	v

To form the table, the numbers 981 in the middle of the second line give the value of g. The end numbers are duplicated, giving 99,811. Below them in the fourth line come the names of the practical units, the initials forming the word *fovac*. Remembering that the electro-magnetic units of resistance and potential were too small for practical use, one places Mag above both Ohm and Volt. Ohm's law and definitions then show that the practical units of capacity, current, and quantity must be less than the electro-magnetic units, hence Mag must be written below Farad, Ampere, and Coulomb. Since the practical units are intermediate in magnitude between Stat and Mag, the vacant spaces are then filled in by Stat. The v's in the bottom line are added from memory. Several examples showing the use of the table are worked out in the paper accompanying the table.—A paper on the law of colour in relation to chemical constitution, by William Akroyd, was read by Mr. Blakesley. The author has observed that, in cases of compounds having a constant radical, R, and a variable radical R', the effect of an increase in the molecular weight of R is to make the colour of the compound tend towards the red end of the colour scale. Exceptions are, however, noted. Mr. H. M. Elder questioned the author's conclusions, saying that in many cases the colours tend towards blue.

Anthropological Institute, April 26.—Dr. Edward B. Tylor, F.R.S., President, in the chair.—Prof. R. K. Douglas read a paper on the social and religious ideas of the Chinese, as illustrated in the ideographic characters of the language. The paper begins with a short introduction, showing that the Chinese ideographic characters are picture-writings, and that as such they supply an interpretation of the meaning of words as these were understood by the inventors of the characters representing them. Following on this is an account of the earliest or hieroglyphic form of the writing, with examples, and the development of this resulting in the ideographic characters. These are taken as being illustrative of the ideas of the people on political, social, scientific, and religious ideas. For example, the importance which was attached to the qualities of a sovereign is exemplified in the choice of the symbol employed to express a supreme ruler, the component parts of which together signify "ruler of himself." By means of the same graphic system a kingdom is shown as "men and arms within a frontier." Passing to the social habits of the people, their domestic life is illustrated by a number of ideograms descriptive of their household arrangements and relationships. In succession are traced in the written characters the ideas associated with men and women, their virtues and their failings; the notions associated with marriage; and the evidences of pastoral as well as of agricultural habits among the people. Turning to the popular religious faiths it is shown how prominent is the belief in the god of the soil, whose presence brings blessings, and whose averted countenance is followed by misfortune. The ideas associated with objects of nature are next treated of, and the paper concludes with references to the coinage of the country as described in the ideograms employed to represent its various forms.—Mr. Joseph Offord, Jun., read a paper on the mythology and psychology of the ancient Egyptians.

Entomological Society, April 27.—Mr. Robert McLachlan, F.R.S., Treasurer, in the chair.—Mr. C. G. Barrett exhibited, for Mr. Sabine, varieties of the following species: viz. one of *Papilio machaon*, bred by Mr. S. Baily, at Wicken, in 1886; one of *Argynnis lathonia*, taken at Dover in September 1883; one of *A. euphrosyne*, taken at Dover in 1890; and one of *A. selene*, taken at St. Osyth, in 1885, by Mr. W. H. Harwood. He also exhibited a long series of *Demas coryli*, reared by Major Still from larvæ fed exclusively on beech, which he said appeared to be the usual food of the species in Devonshire, instead of hazel or oak. Mr. Barrett also exhibited, for Mr. Sydney Webb, a number of varieties of *Arge galathea*, *Lasiommata megæra*, *Hipparchia tithonus*, and *Cœnonympha pamphilus*, from the neighbourhood of Dover.—The Rev. J. Seymour St. John exhibited a variety of the female of *Hybernia progemmaria*, taken at Clapton in March last, in which the partially developed wings were equally divided in point of colour, the base being extremely dark and the outer portion of the wing very pale.—The Rev. Canon Fowler made some remarks on the subject of protective resemblance. His attention had been recently called to the fact that certain species of *Kallima* apparently lose their protective habit in some localities, and sit with their wings open; and Dr. A. R. Wallace had informed him that he had heard of a species sitting upside down on stalks, and thus, in another way, abandoning its protective habits. Mr. W. L. Distant referred to certain species of South African butterflies, which, when at rest, were protected by their resemblance to the plants on which they reposed, or by their resemblance to the rocks on which they settled, but which frequently abandoned their protective habit and sat with open wings. Mr. Barrett Mr. McLaclan, Mr. Jacoby, Mr. Champion, Mr. H. Goss Canon Fowler, and Mr. Frohawk continued the discussion.—Mr. Goss informed the meeting that, in pursuance of a resolution of the Council passed in March last, he and Mr. Elwes had represented the Society at the recent Government inquiry as to the safety and suitability of the proposed rifle range in the New Forest, held at Lyndhurst by the Hon. T. W. H. Pelham, on the 20th, 21st, 22nd, and 23rd inst., and that they had given evidence at such inquiry.

PARIS.

Academy of Sciences, April 25.—M. d'Abbadie in the chair.—On the photography of colours (second note), by M. G. Lippmann. In his first communication on colour photography, M. Lippmann remarked that the results would have been much better if isochromatic films had been employed. He has now obtained some new pictures, and presented them to the Academy. Silver bromide films, stained with azalin and cyanin, were used in connection with the arrangement previously explained. The solar spectrum appears to have been photographed in all its beauty with an exposure of about thirty seconds. On two of the plates the colours viewed by transmitted light are seen to be complementary to those given by reflected light. A photograph of a window containing red, green, blue, and yellow glasses appears to be very satisfactory. Others of a group of drapery and a parrot were obtained with an exposure of from five to ten minutes. Several hours' exposure were given to a plate of oranges surmounted by a poppy, diffused light being employed. In all cases the forms of the objects were reproduced as well as the colours.—On the means employed in producing rain artificially, by M. Faye. The author states Espy's opinions on the formation of cyclones and other atmospheric disturbances, and quotes a letter on rain-making experiments carried out in Florida in 1857. He is of opinion that the theory which led to the experiments is wrong. For, according to M. Faye, (1) water-spouts, tornadoes, and cyclones move quickly during calm weather: ascending columns of heated air do not move. (2) Tornadoes and water-spouts whirl vigorously in a certain direction: ascending columns of air do not rotate, or only do so very faintly. (3) Tornadoes and water-spouts are cold in the centre: ascending columns of air are warm. (4) Tornadoes and water-spouts descend from clouds: ascending columns rise towards the clouds, &c.—On the division, according to terrestrial latitudes and longtitudes, of the geological groups on the earth, by M. Alexis de Tillo. The following are the sums of the distribution of groups of rocks, &c., given in the tables for every ten degrees of latitude; the dimensions are expressed in millions of square kilometres:—

Pre-Cambrian ...	19·85	Glaciers	1·94
Primary	17·18	Igneous rocks ...	3·96
Secondary	19·85	Coral islands ...	0·02
Tertiary	8·71	Region { Explored	98·03
Quaternary	19·17	Unexplored	36·16
Gravels	7·35	Total	134·19

Tables are also given showing the proportion of the known surface of the globe occupied by each of the above groups, and also showing the distribution in longitude.—Observations of two new planets, discovered at Nice Observatory on March 22 and April 1, by M. Charlois. Observations for position are given.—Photography of the Ring Nebula in Lyra, by M. F. Denza.—Solar observations made during the first quarter of 1892, by M. Tacchini. (See Our Astronomical Column).—On a problem in mathematical analysis connected with equations in dynamics, by M. R. Liouville.—Direct and indirect measures of the angle which the surface of a liquid makes with glass which it does not wet, by M. C. Maltézos.—On thermo-electric phenomena produced by the contact of two electrolytes, by M. Henri Bagard.—Addition to the law of the position of nervous centres, by M. Alexis Julien.—Analysis of a chromiferous clay from Brazil, by M. A. Terreil.—On the waters and muds of the lakes of Aiguebelette, Paladru, Nantua, and Sylans, by MM. L. Duparc and A. Delebecque.

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